

Autism Management System

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Abstract- Management is a combination of both processes and procedures, used to ensure that an organization can fulfill all tasks required to achieve its objectives. Management system enables an organization to improve their environmental performances through a process of continuous improvement. Autism is the fastest growing developmental disorder in the world today. The development and implementation of Autism Management System (AMSAL) is aimed at having a systematic, scientific and comprehensive assessment for children with autism. Autism Treatment Evaluation Checklist (ATEC) is used as a dynamic assessment of the training effect in order to ensure the effectiveness of the rehabilitation training for autistic children. The application enhances the efficiency of the evaluation of autistic children, solves the problem of expert resource shortage, facilitates a rapid development of the rehabilitation and the career of children with autism, and makes sure that all the children could grow up happily and healthily. This system implements an automated system via online appointment and SMS notification as a reminder to improve the efficiency of work in the centre. The system also supports localization so that a quick press of a button could produce a report in the native language using a rule based translation system. A combination of patient data analysis is also provided to have a quick view on the category of ATEC using different demographic criteria. The benefit that could be gained are this Web-based system would be helpful for evaluating the quality of assessment of the autistic child and also enhances the quality of health care service, providing a higher satisfaction and greater compliance for autism society.

Keyword: Autism Treatment Evaluation Checklist (ATEC), autism progress, development assessment, management system

1. INTRODUCTION

The use of a web-based system has become popular in the recent years. Web-based system represents the excellent example of managing online process in order to get better achievement of the working process. The development and implementation of evaluation are aimed at having a systematic, scientific and comprehensive assessment.

In this paper, the problems identified are the monitoring the development progress flow and managing data. Unsystematic appointment schedule is also identified as a problem without proper notification to alert the parents. The development progress is ambiguous as it uses manual way to do statistic evaluation and not generating report.

The basic flow of the methodology applied is the waterfall model. The first phase is known as the requirement specifications. In this phase, all the requirements are gathered from the stakeholder and to study the problem of the evaluation development progress flow. The next phase is the system design phase, created to design and develop the web system and also to notify and alert via email and SMS. For integration and system testing phase, this aims to evaluate the prototype functionality after being implemented

The autism management system is integrated with Autism Treatment Evaluation Checklist (ATEC). There are 4 assessment fields which are speech/language/communication, sociability, sensory/cognitive awareness and health/physical/behavior. Each assessment field is independent and shielded from other fields when assessing. For appointment, the notification is integrated with email and SMS.

This system is designed and developed with PHP that could provide data access interface to the data. It provides the possibility to develop the application with a powerful Web data access. This system uses MySQL as the back-end database which has a powerful data managing and solving capacity with a higher security performance.

2. PROBLEM DEFINITION

The problem that has been studied is the manual evaluation of the child development progress. The dependence on manual operation for results analysis and transition will cause the repetition work of statistical calculation and charting.

3. RELATED WORK

Web based platform on the development progress of children with autism has been recognized as the key technique for providing a platform which improves development of children. Based on the studies done in Asia, "In recent years, the incidence of autism is on the rise, and there are around 67 million patients with autism in the world. But the etiology is still unknown." [1] This problem occurred because they were not aware of autism, assessment and the rehabilitation of autism.

3.1 Management System

As the rapid advancement and wide application of computer hardware, software and network, management systems have entered almost all hospitals, and becoming more important and covering more parts in daily hospital operations. [2] In the management system, this provides the users an easier and faster way in doing their medical tasks with graphic user interface. Below are the details of the components in management system for medical purpose.

| | |
|----------------------|---|
| Management System | An integration platform that aligns business strategies with IT and enabling future integration of other systems (existing systems, or future deployments) into the medical IT ecosystem. |
| User Interface | Combination of the existing user interfaces enabled to communicate via web-services. |
| Management UI Module | Management user interface to enable maintenance and administration tasks required to be carries out by the administrators on the custom components. |

Table 2.1 Details of Components

3.2 Appointment and Notification via SMS

With the accelerating pace of life, people have no patience to spend time in waiting. Therefore, a high efficiency and quick booking service has been developed. [3] Through SMS messages, appointment details could be received by the parents and no time would be wasted on dealing with attendance of an appointment. Due to the highly reliable nature of SMS, the parents will receive the message even if their phone is turned off at that time.

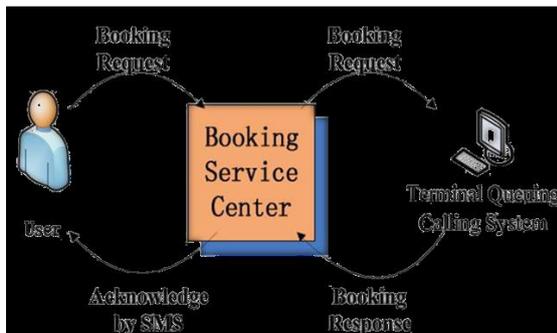


Figure 3.1 Reservation Request Process

3.3 Autism Treatment Evaluation Checklist (ATEC)

Diagnosis of the disorder at a very early age is crucially important, because early intervention shows dramatic differences in longer-term patient outcomes and level of disability. [4] A major obstacle in autism research has been the lack of measuring the effectiveness of various treatments. The Autism Treatment Evaluation Checklist (ATEC) was developed by Bernard Rimland and Stephen M. Edelson of the Autism Research Institute. This technique is used to monitor the progression of the child.

Table

| | Scale 1 Speech | Scale 2 Sociability | Scale 3 Sensory / Cognitive Awareness | Scale 4 Health / Physical / Behavior | |
|-----------------|-------------------|------------------------|--|--|-----------------------|
| | Range : 0 - 28 | Range : 0 - 40 | Range : 0 - 36 | Range : 0 - 75 | Total Range : 0 - 180 |
| Centile Mild | 0 - 2 | 0 - 4 | 0 - 5 | 0 - 8 | 0 - 30 |
| 0 - 9 | 3 - 5 | 5 - 7 | 6 - 8 | 9 - 12 | 31 - 41 |
| 10 - 19 | 6 - 7 | 8 - 10 | 9 - 11 | 13 - 15 | 42 - 50 |
| 20 - 29 | 8 - 10 | 11 | 12 - 13 | 16 - 18 | 51 - 57 |
| 30 - 39 | 11 - 12 | 12 - 13 | 14 - 15 | 19 - 21 | 58 - 64 |
| 40 - 49 | 13 - 15 | 14 - 15 | 16 - 17 | 22 - 24 | 65 - 71 |
| 50 - 59 | 16 - 19 | 16 - 18 | 18 - 19 | 25 - 28 | 72 - 79 |
| 60 - 69 | 20 - 21 | 19 - 21 | 20 - 21 | 29 - 32 | 80 - 89 |
| 70 - 79 | 22 - 24 | 22 - 25 | 22 - 25 | 33 - 39 | 90 - 103 |
| 80 - 89 | 25 - 28 | 26 - 40 | 26 - 36 | 40 - 75 | 104 - 179 |
| 90 - 99 | | | | | |
| Severe | | | | | |

Table 2.2 Score Distributions

In the Table 2.2, it shows the score distributions of ATEC. It consists of four assessments including speech, sociability, sensory / cognitive awareness and health / physical / behavior with its own range of score. Basically, the lower the score, the fewer the problems.

4. Method

Based on the developed system, we applied the waterfall methodology for development process. The methodology is selected because it suits this project development as the project is a prototype application that has developed within 4 to 7 months.

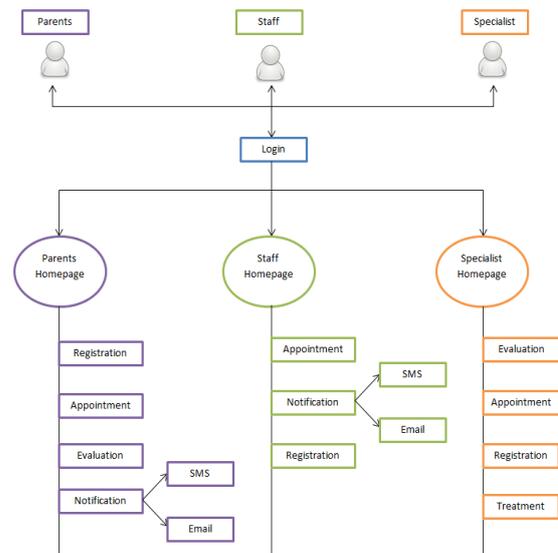


Figure 4.1 Motivational Use Case

In Figure 4.1, the system has been split into 3 types of user; Parents, Staff and Specialist. Each user has their own roles in this system. The specialists would concentrate on the evaluation progress of the child. The staffs would be responsible for scheduling. The staff would concentrate on the appointment and notification. For notification they need to alert the parents about the appointment that had been booked previously and notify the parents via SMS and email. For the parents, they would focus more on registration, appointment and evaluation. Each module is related to each other so that the development progress of children with autism could be done perfectly.

5. Implementation

The Autism Management System is an effective system that is different from other management systems for autism. Most of the systems aim in the management aspect of autism but not the evaluation progress of the child. ATEC is the technique used for evaluating the development progress of children with autism. For a more advanced evaluation, we applied the productive line graph for the child development progress using the chart JavaScript.

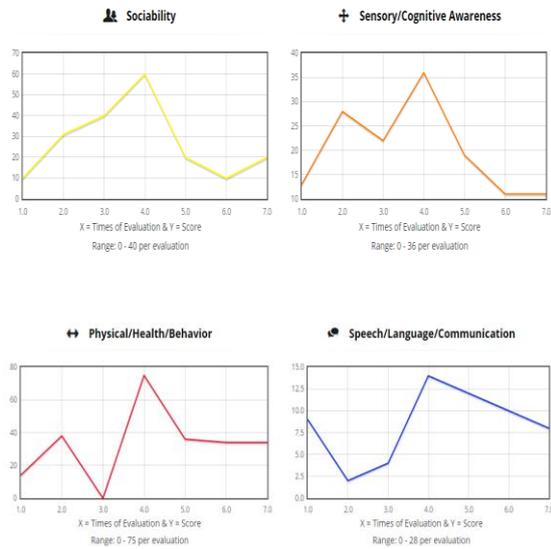


Figure 5.1 ATEC Development Progress Line Graph

6. Result

There are 15 evaluators involved in usability testing. Figure 6.1, shows the results acquired based on the answers in the evaluation forms in determining whether the system flow is clear. 60% of the evaluators strongly agreed with it while 33% of the evaluators believed that the overall project is good and were satisfied with the overall system complexity. There were only 7% of the evaluators that were neutral about the overall system complexity.

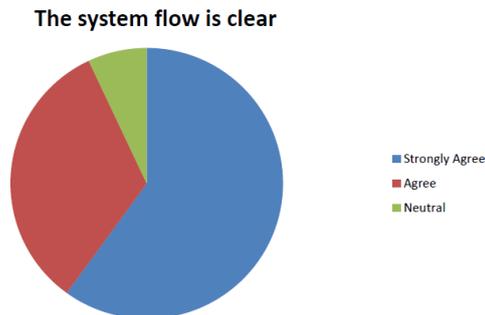


Figure 6.1: The system flow is clear

7. Summary and Conclusion

The development of AMSAL is to manage and evaluate the progression of children with autism in Malaysia since the awareness among Malaysians about autism is still very low. ATEC would be an effective and suitable technique to be implemented by specialists in autism centre to evaluate the progress of a child. This system could also be improved by making a mobile version of ATEC so that specialists could fill it in during the treatment session. In the future, AMSAL would be suitable as a management and evaluation system for autism. Autism itself is not the enemy, but the barriers to development that are included with autism are the enemy. The retardation that springs from a lack of development is the enemy. The sensory problems that act as the barriers themselves are the enemy. Work with the autism problem, not against it, and to overcome the developmental barriers.

8. References

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